

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: DURAND, Claude; DOTTE, Emmanuel; CASANOVA, Robert; ACCARDO, Jean-Luc

SERIAL NO.: (International Appn No. PCT/FR03/00035)

FILED: Herewith (Intl. Filing Date 8 January 2003)

TITLE: METHOD AND AUTOMATED SYSTEM FOR STORING AND DISTRIBUTING  
VARIOUS OBJECTS OR ARTICLES

Preliminary Amendment: CLAIM AMENDMENTS

1. (Currently amended) Process for selective ~~stocking and dispensing~~ storing and distributing of various objects or articles, according to which the objects are stocked in bays of trays of an assembly of racks in front of which moves, on two perpendicular axes, a system for proper extraction controlled by a command and control system, in a manner so as to position itself in front of the bay of a tray holding the stock of articles corresponding to the selected object, in order to remove at least one of these articles, ~~characterized in that~~ said process comprising the steps of:

storing the objects or articles ~~(11)~~ of a same reference ~~are stocked~~ one after the other, on ~~the~~ an upper side ~~(13a)~~ of one or more endless idle-mounted conveyor belts ~~(13)~~, one or more of the conveyor belts ~~(13)~~ comprising ~~the~~ a receiving surface for each of the different bays ~~(14)~~ of a stocking rack ~~(1)~~; and

driving, ~~and in that the~~ selective motorization of the conveyor belts, ~~driving~~ the displacement of the articles that they support in the direction of a removal point, ~~is obtained by the~~ application of motorized rollers mounted on a mobile extractor ~~(3)~~ moving in front of the stocking rack, and driving by friction the conveyor belt(s) ~~(13)~~ of the bay ~~(14)~~ supporting the selected or

ordered articles, in a manner so as to enable the transfer of the first of these articles onto a receiving surface of the extractor.

2. (Currently amended) Automated system for ~~stocking and dispensing~~ storing and distributing various objects and articles, ~~of the type consisting of~~ comprising:

an assembly of a plurality racks ~~(1)~~ comprising a plurality of superposed trays ~~(2)~~, each rack ~~constructed~~ comprised of one or more bays ~~1(4)~~ for stocking articles ~~(11)~~, so that the objects of a same reference can be placed in a same bay;

a ~~mechanism~~ means for receiving and transport driven by a command and control system able to move in front of ~~this said~~ assembly of racks, on two perpendicular axes, in a manner so as to be ~~able to position itself~~ positionable in front of the bay ~~(14)~~ supporting the stock of articles that corresponds to the selected object and to transfer this article to an opening or delivery chamber ~~(7)~~;

an extraction system enabling the transfer of the selected object onto the receiving and transport mechanism ~~(3-4)~~; and

~~and a user interface (8)~~ comprising ~~mechanisms~~ means for display and selection ~~(9)~~ of the objects, and if necessary, mechanisms for automatic payment ~~(10)~~;

~~characterized in that the~~ wherein a receiving surface of the bays ~~(14)~~ on which the stocked articles ~~(11)~~ rest is comprised of the upper side ~~(13a)~~ of endless idle-mounted conveyor belts ~~(13)~~, and ~~in that the~~ wherein receiving and transport ~~mechanism~~ means of the extraction system is comprised of an extractor ~~(3)~~ ~~equipped with~~ comprised of motorized friction rollers ~~(23)~~, ~~mechanisms (24, 24a, 25, 26, 27, 41, 50, 31)~~ allowing the means for application of the motorized

friction rollers~~(23)~~ against the conveyor belt or group of conveyor belts~~(13)~~ of the bay supporting the selected or ordered articles, in a manner so as to allow the transfer of the first of these articles ~~(11)~~ onto the receiving surface~~(22a)~~ of the extractor.

3. (Currently amended) Process according to claim 1, ~~characterized in that~~ wherein the objects~~(11)~~ removed in sequence from one or more bays by the extractor~~(3)~~ during an order for several articles are transferred by the extractor onto a collecting mat~~(4)~~ moving with the extractor and able to receive and temporarily store the removed objects before they are transferred to an opening or delivery chamber.

4. (Currently amended) Process according to ~~one of the claims 1 or 3,~~ characterized in that the Claim 1, wherein transfer of objects ~~(11)~~ from their stocking bay~~(14)~~ to the delivery opening~~(7)~~ is ensured by conveyance on their support side using the conveyor belts~~(13, 22, 4, 6)~~.

5. (Currently amended) Process according to ~~any one of the claims 1, 3 or 4,~~ characterized in that the regulation Claim 1, further comprising: regulating of the width of the bays~~(14)~~ as a function of the size and the conformation of the objects~~(11)~~, ~~is obtained by movable partitions(15)~~ dividing each tray~~(2)~~ into several bays comprising a variable number of conveyor belts~~(13)~~.

6. (Currently amended) Process according to ~~any one of the claims 1 or 3 to 5,~~ characterized in that Claim 1, further comprising: assigning bar codes ~~(43)~~ are assigned:—  
——on the one hand, to each of the conveyor belts ~~(13)~~ of the trays~~(2)~~, and;

~~on the other hand~~, to each possible positioning height of the trays (2) on the vertical members (12);

and in that the wherein layout of the trays (2) and the bays (14) is registered in the command and control system of the system using a portable bar code reading terminal.

7. (Currently amended) Process according to ~~any one of the claims 1 or 3 to 6~~, characterized by the following stages Claim 1, further comprising:

~~selection of~~ selecting the objects remotely over a computer network linked to the system;

~~reservation of~~ reserving the ordered objects remotely, for a specified time period; and

~~removal and delivery of~~ removing and delivering the objects ordered by the system, after the user calls the file number remotely displayed using the display and data capture screen (9), and, if necessary, payment of the price of the objects using the automatic payment peripherals (10).

8. (Currently amended) System according to claim 2, ~~characterized in that the~~ wherein said receiving surface of each stocking tray (2) is comprised of a plurality of slightly spaced endless narrow conveyor belts (13), idle-mounted individually, ~~and in that the~~; wherein a metallic framework (2a) arranged under the upper side (13a) of these belts is provided with rows of openings (15b) extending in parallel to the belts and below the spaces arranged between them for the removable mounting of vertical separators (15) that enable the division of each tray (2) into several bays (14) with equal or different widths and having receiving surfaces that are comprised of one or more conveyor belts.

9. (Currently amended) System according to ~~one of the claims 2 or 8, characterized in that~~ the Claim 8, wherein vertical members ~~(12)~~ and the lateral edges of the metallic structure ~~(2a)~~ of the trays are constructed in a complementary manner in order to enable the removable fixation at different heights of the trays onto the vertical members.

10. (Currently amended) System according to ~~any one of the claims 2, 8 or 9, characterized in that~~ Claim 2, wherein the receiving surface of the extractor or each extractor ~~(3)~~ is comprised of the upper side ~~(22a)~~ of a plurality of endless conveyor belts ~~(22)~~ having the width and spacing corresponding approximately to the width and spacing of the conveyor belts ~~(13)~~ of the trays ~~(2)~~.

11. (Currently amended) System according to ~~any one of the claims 2 or 8 to 10, characterized in that it consists of~~ Claim 2, further comprising: an assembly for extraction comprising at least one extractor ~~(3)~~ and a collecting mat ~~(4)~~ comprised of an endless conveyor belt ~~(4)~~.

12. (Currently amended) System according to ~~any one of the claims 10 and 11, characterized in that the~~ Claim 10, wherein the upper side ~~(22a)~~ of the conveyor belts ~~(22)~~ of the extractor or each extractor ~~(3)~~ and the upper side ~~(16a, 16b)~~ of the collecting mat ~~(4)~~, rotate in perpendicular directions and are preferably placed at the same level.

13. (Currently amended) System according to ~~any one of the claims 2 or 8 to 12, characterized in that~~ Claim 2, wherein the assemblies of racks are arranged in two parallel rows ~~(R1,~~

R2) facing each other and ~~in that~~ wherein the extraction assembly can move between the two rows and ~~consists~~ are comprised of a collecting mat-(4) and two extractors-(3) arranged on both sides of the collecting mat-(4).

14. (Currently amended) System according to ~~any one of the claims 2 or 8 to 13,~~ characterized in that the Claim 2, wherein the extractor-(3) or the assembly comprised of the extractor-(3) and the collecting mat-(4) is carried on a robot with two axes-(5) moving in front of the rows of the racks-(1).

15. (Currently amended) System according to ~~any one of the claims 2 or 8 to 14,~~ characterized in that Claim 2, wherein the assembly of mechanisms ensuring the transfer of the ordered objects-(11) from their stocking bay-(14) to the delivery opening-(7) is comprised of conveyor belts-(13, 22, 4 and 6).

16. (Currently amended) System according to ~~any one of the claims 2 or 8 to 15,~~ characterized in that Claim 2, wherein each of the belts-(13) of the trays-(2), as well as the possible positioning heights of the trays-(2) on the vertical members-(12) are identified using bar codes-(43) placed behind the racks-(1) on the opposite side from the removal side.

17. (Currently amended) System according to ~~any one of the claims 8 to 16, characterized in that~~ Claim 8, wherein the conveyor belts-(22) of the extractor-(3) or each extractor-(3) are driven at a speed greater than that of the conveyor belts-(13) of the trays-(2) and ~~in that~~ wherein the carrying

surface of the conveyor belts-(22) of the extractor-(3) or each extractor-(3) have, preferably, a coefficient of adhesion greater than the carrying surface of the conveyor belt-(13) of the trays-(2).

18. (Currently amended) System according to ~~any one of the claims 2 or 8 to 17,~~ characterized in that Claim 2, wherein the extractor-(3) or each extractor-(3) is ~~equipped with~~ comprised of a sensor-(37) that detects the space created behind the object removed-(11a) and starts the uncoupling of the friction rollers-(23) and the belts-(13) of the trays-(2) and thus stops the advance of the other objects of the bay involved.

19. (Currently amended) System according to ~~any one of the claims 2 or 8 to 18,~~ characterized in that Claim 2, wherein the extractor (3) or each extractor (3) ~~consists of~~ comprises: =  
~~on the one hand,~~

a mobile slide valve-(21) carrying the pressure rollers-(23) designed to come to rest against the front ends of the belts-(13) of the trays-(2), wheels-(38) for driving in rotation the pressure rollers-(23) using the crowns-(39) and the front pulleys-(46) on which are wound the conveyor belts (22) of the extractor, the upper side-(22a) of which rotates above this slide valve-(21);, and, ~~on the other hand,~~ mechanisms

means for ensuring movements for docking and detachment of the mobile slide valve (21), in a manner so that the slide valve can occupy two positions, either a first neutral position in which the pressure rollers-(23) are far from the ends of the belts-(13) of the trays-(2) and a second active position according to which the rollers-(23) are pressed against the ends of the belts-(13) of the trays-(2).

20. (Currently amended) System according to ~~any one of the claims 2 or 8 to 19,~~ characterized in that Claim 1, wherein the extractor ~~(3)~~ or each extractor ~~(3)~~ is ~~provided with~~ comprised of mechanisms (31) that ensure the means ensuring elastic support of the pressure rollers ~~(23)~~ against the front ends of the belts ~~(13)~~ of the trays ~~(2)~~.

21. (Currently amended) System according to ~~claims 19 and 20,~~ characterized in that the ~~mechanisms~~ Claim 19, wherein means for ensuring the docking and detachment movements of the mobile slide valve ~~(21)~~ comprise a motor shaft ~~(24)~~ driving unidirectionally, by the intermediary of a catch, a crown ~~(26)~~, a brake ~~(28)~~ mounted near the crown and the shoe or block ~~(28a)~~ of which can be supported on the periphery of the crown, a flexible connection such as a cable ~~(27)~~ affixed, by the intermediary of its opposite ends, on the one hand, to the crown ~~(26)~~ and, on the other hand, to the end of the shaft ~~(30)~~ axially mobile against the opposing action of a spring ~~(31)~~, this cable winding on a pulley ~~(41)~~ carried by a mobile instrument ~~(40a)~~ of a magnetic valve ~~(40)~~ that makes it possible to make the pulley ~~(41)~~ united in translation with the mobile slide valve ~~(21)~~.

22. (Currently amended) System according to claim 21, characterized in that the mobile instrument ~~(40a)~~ of the magnetic valve ~~(40)~~ is subjected to the action of a return spring ~~(42)~~ tending to restore the position of adherence to the mobile slide valve ~~(21)~~.

23. (Currently amended) System according to ~~any one of the claims 10 to 22,~~ characterized in that Claim 10, wherein the driving in rotation of the pressure rollers ~~(23)~~ is obtained by ~~means of~~ the conveyor belts ~~(22)~~ using a graduated wheel ~~(38)~~ over a large diameter of which each belt ~~(22)~~



wound and by ~~means of~~ a crown (39) wound, ~~on the one hand,~~ over the small diameter of the graduated wheel (38); and, ~~on the other hand,~~ over the pressure roller (23).

24. (Currently amended) System according to claim 23, ~~characterized in that~~ wherein the extractor (3) or each extractor (3) ~~consists of~~ comprises systems for clutching making possible the selective drive of each conveyor belt (22), each of these clutch systems comprising a drum (32) on which a conveyor belt (22) is wound, this drum being driven in rotation by the intermediary of an epicycloidal gear train consisting of a motor pinion (34), satellites (35), an intermediate crown (33) and the drum (32), the intermediate crown (33) of this epicycloidal gear train provided with peripheral notches (48) into which the mobile sliding bolt (36a) of an electric latch (36) can engage.